

CLAIMS

1. A voltage measurement device for dividing a plurality of voltage sources into a plurality of blocks each having at least one voltage source and for
5 measuring voltage of a block, the voltage measurement device comprising:

a first group of switches including a first MOSFET of a first conductivity type, which has a first main electrode connected to a first voltage input terminal connected to one terminal of a block and which is turned ON/OFF in correspondence with voltage impressed on a control electrode
10 based on voltage impressed on the first main electrode, and a second MOSFET of the first conductivity type, which has a first main electrode connected to a second voltage input terminal connected to the other terminal of the block and which is turned ON/OFF in correspondence with voltage impressed on a control electrode based on voltage impressed on the first main electrode;

15 a first storage element provided with respect to each block and also connected between a second main electrode of the first MOSFET of the first conductivity type and a second main electrode of the second MOSFET of the first conductivity type;

a second group of switches including a first MOSFET of a second
20 conductivity type opposed to the first conductivity type, which has a second main electrode connected to one terminal of the first storage element and a first main electrode connected to a first voltage output terminal and which is turned ON/OFF in correspondence with a signal inputted to a control electrode, and a second MOSFET of the second conductivity type, which has a second
25 main electrode connected to the other terminal of the first storage element and a first main electrode connected to a second voltage output terminal and which is turned ON/OFF in correspondence with a signal inputted to a control electrode;

a third group of switches including a third MOSFET of the second
30 conductivity type, which has a second main electrode connected to the control

electrode of the first MOSFET of the first conductivity type and which is turned ON/OFF in correspondence with a signal inputted to a control electrode and a fourth MOSFET of the second conductivity type, which has a second main electrode connected to the control electrode of the second MOSFET of the first conductivity type and which is turned ON/OFF in correspondence with a signal inputted to a control electrode; and

control means for turning on the first group of switches by turning on the third group of switches and for turning on the second group of switches while the first group of switches is turned off by turning off the third group of switches.

2. The voltage measurement device of claim 1, further comprising a second storage element having one terminal connected to the other terminal of the first storage element, wherein:

the first group of switches further includes a third MOSFET of the first conductivity type, which has a second main electrode connected to the other terminal of the second storage element and a first main electrode connected to the second voltage input terminal and which is turned ON/OFF based on voltage impressed on the first main electrode;

the second group of switches further includes a fifth MOSFET of the second conductivity type, which has a second main electrode connected to the other terminal of the second storage element and a first main electrode connected to a third voltage output terminal held at ground potential and which is turned ON/OFF in correspondence with a signal inputted to a control electrode; and

the third group of switches further includes a sixth MOSFET of the second conductivity type, which has a second main electrode connected to a control electrode of the third MOSFET of the first conductivity type and which is turned ON/OFF in correspondence with a signal inputted to a control electrode.

3. The voltage measurement device of claim 1, further comprising means for raising potential outputted from the first main electrode of the second MOSFET of the second conductivity type to the second voltage output terminal with respect to ground potential by constant voltage.

4. The voltage measurement device of claim 1, further comprising a current limit part for limiting currents flowing through the plural MOSFETs included in at least one of the first, second and third groups.

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5. The voltage measurement device of claim 4, wherein the current limit part is formed by a resistant element and a voltage limiting element both inserted in series between the first main electrode and the control electrode of the first MOSFET of the first conductivity type and a resistant element and a voltage limiting element both inserted in series between the first main electrode and the control electrode of the second MOSFET of the first conductivity type, both of the first MOSFET and the second MOSFET being included in the first group of switches.

6. The voltage measurement device of claim 4, wherein the current limit part is formed by a resistant element connected to the first main electrode of the third MOSFET of the second conductivity type and a resistant element connected to the first main electrode of the fourth MOSFET of the second conductivity type, both of the third MOSFET and the fourth MOSFET being included in the third group of switches.

7. The voltage measurement device of claim 1, wherein
the control means turns on the first groups of switches of the plural blocks simultaneously to allow the respective first storage elements corresponding to the respective blocks to hold end-to-end voltage thereof, and

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further turns on one or more second groups of switches in the second groups of switches of the plural blocks simultaneously while the first groups of switches of the plural blocks are turned off, thereby causing voltage held by one or more first storage elements corresponding to the one or more second groups of switches to be outputted from one or more voltage output terminals corresponding to the one or more second groups of switches.

8. The voltage measurement device of claim 1, wherein:

the control means turns on one or more first groups of switches in the first groups of switches of the plural blocks simultaneously to allow one or more first storage elements corresponding to one or more blocks to hold end-to-end voltage of the one or more blocks corresponding to the one or more first groups, and further turns on one or more second groups of switches corresponding to the one or more first groups of switches simultaneously while the one or more first groups of switches are turned off, thereby causing voltage held by the one or more first storage elements to be outputted from one or more voltage output terminals corresponding to the one or more second groups of switches.

9. The voltage measurement device of claim 1, wherein when the plural voltage sources are positive voltage, the first group of switches comprises Pch-MOSFETs, while the second group of switches and the third group of switches comprise Nch-MOSFETs.

10. The voltage measurement device of claim 1, wherein when the plural voltage sources are negative voltage, the first group of switches comprises Nch-MOSFETs, while the second group of switches and the third group of switches comprise Pch-MOSFETs.

11. The voltage measurement device of claim 1, further comprising a voltage

limiting element arranged between the voltage output terminals and/or between the voltage output terminal and ground.